DOCUMENT RESUME

ED 316 189 IR 014 176

AUTHOR Foster, John F.
TITLE Classroom Change (Three Papers).
PUB DATE Mar 88
NOTE 13p.; Three papers presented at a Meeting of the International Council on Computers in Education (Edinburgh, Scotland, March 1988).
PUB TYPE Viewpoints (120) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Assisted Instruction; *Educational Technology; Elementary Secondary Education; Foreign Countries; Microcomputers; *National Programs; Teacher Attitudes
IDENTIFIERS *Great Britain

ABSTRACT

The first paper, "Pupils--Panaceas and Pragmatism," provides background on computer-assisted instruction and national programs in Great Britain for introducing computers into the schools. The second paper (untitled) looks at the status of computers in education in Great Britain, the effects of the national curriculum on computer use, and some of the activities undertaken as part of a 5-year national program highlighting the uses of instructional technology in the curriculum. In examining problems and strategies related to the integration of the computer into the learning process, the third paper, "Provoking, Supporting, and Sustaining Classroom Change," focuses on the role of advisory teachers, i.e., teachers with curriculum expertise and training in instructional technology. (MES)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED316189

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PAPERS CONCERNING CLASSROOM CHANGE

John F. Foster

March 1988

IR014176

BEST COPY AVAILABLE

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

J.P.Foster

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it
☐ Minor changes have been made to improve reproduction quality
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
J.F. Foster
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

PUPILS - PANACEAS AND PRAGMATISM

J.F. Foster*

ABSTRACT

There are problems in getting a balanced view of the roles of the computer in education. These can include the too ready use of the computer for trivial tasks as well as teachers' unpreparedness to adopt computer related methods even where they appear to be obvious and most attractive.

This paper addresses the need for the consideration of strategies to get the computer integrated into the learning process through all ages and stages of learning. It considers the rights of the learner to exposure to the seductive power of the new technologies and the wide experiences that are possible which assist the learning process - and the essential need to expose the learner to the full potential of the new technologies.

INTRODUCTION

As a profession we are usually slow to adapt to change. We are very bad at telling our clients what we are up to. However, there is, it seems, always something that some of us are shouting about. Something that is "in vogue" will engage the attention of the few, who, like the monkey without a tail, rush around trying hard to convince their colleagues that theirs is the way of life that all should adopt for their own good. Mostly no one listens. Just occasionally the few become many and the trend becomes too big to ignore. It gets seized by the media, exploited by the politicians. If the public, our clients, get hold of the ideas they may start to want them for their children - but because we haven't bothered to tell them much about what we are trying to do, they may want them for quite the wrong reasons or reject them through ignorance or media generated prejudice. Colleagues begin to feel guilty if they are not engaged in the new ways or they stubbornly resist them, hoping that the trend, like other trends, will pass. It seems that now new trends come around more quickly than they did and, because we are in this era of mass communication, they spread more widely and faster.

As a profession we have to learn to recognise fools and fools' gold. Are we the peddlers of the computer as the panacea of all educational ills? Do we proselytise our colleagues from a position that is well thought out and unassailable? Are we being conned? How can we be sure? Are we able to deliver the "new Jerusalem" we are trusting in? Where on earth do we go from here?

THE COMPUTER REVOLUTION

It is always easier at the beginning of change. Back in the '70s few of us could have access to a computer, even if we wanted it.

* Director, Microelectronics Education Support Unit, Sir William Lyons Road, Science Park, University of Warwick, Coventry CV4 7EZ

IR014176

The few that could were usually hobbyists, using their enthusiasm to persuade their schools of the need to buy them equipment or bringing in their own machines, often kit assembled. Sometimes the local authority or School Board plumbed schools into spare capacity on a local mainframe - teletypes chattering back the results of batch processing classes' assignments. The objectives were largely that (some) children should get experience/learn about the new technologies. There were claims for programming as the Latin of the twentieth century ("it trains the mind") and the computer became something for the few to study: its history, its industrial archeology, its social impact, its architecture - and programming. Almost by accident, it seems now, CBL, CAI, CML, CAD, CAL and probably a dozen more sets of initials began being banded about (there were arguments between officianados as to what was which). We were into the regime of "have solution now - need problem to match". Amazingly trivial tasks were given to computers. Often the easiest of things to teach, or that bit of real experience so essential for the development of concepts was relegated to the computer. The easy was made complex; the obvious obscure. The machine that was showing, in its better moments, a rare power of seducing young minds, allowing them to perform above our expectations of their abilities, risked being killed off by over selling as a cure-all; that the "in set" would succeed in making it all so complicated that only the few, resolute enough to cut through the jargon and determined enough to understand the handbooks and documentation written exclusively for the cognoscenti, would be able to join the club; that the computer "movement" would be tarred with all the excesses of the teaching machine movement and with all its problems of incompatibility and of hardware fragility. Just in time came National Programmes - in the UK the SMDP (the Scottish Microelectronics Development Programme) and the MEP (the Microelectronics Education Programme). A grip was taken. Advice was at hand. Money was spent. Policies were assembled. At the same time, computers became cheaper and infinitely easier to use. Colour appeared on screens. Peripherals proliferated. Objectives were discussed. Teachers were trained and had software written for them.

NATIONAL PROGRAMMES

These were heady days. We rushed headlong into our enthusiasm. For the educational technologists amongst us, at last we had a system that could make possible our ideas of learners taking a greater responsibility for their own learning, of children learning at their own pace, of alternative routes to learning goals. I have never known so dramatic and so speedy an uptake of new ideas as came with the availability of computers and of all that they delivered. For once we were marching in step with the objectives of our political paymasters. Change felt good. Classrooms were exciting.

The first phase of the UK programmes lasted about five years. They created awareness to some level in every school in the country. Of course by no means every teacher was set on fire. It was just as well they were not. Although a lot of computers were bought, with pump priming by our Department of Trade and Industry, there were

(and are) still nowhere near enough of them to have been able to satisfy every teacher or even every classroom. There was insufficient inservice training and what there was far to often was more concerned with how rather than why and when to use computers. The programs were (and are) too often self contained with no guidance as to how they can be integrated into the curriculum. Teachers were being asked, often untrained, to take on learning management roles - and with perhaps only one machine available for a whole class of children. ("Should the computer be used only for the very bright/the very dull?"; " How do I stop them queuing up?"; "it's crashed again!"; "Well done! You have finished that work so you can go and use the computer").

Sometimes through pragmatism (though sometimes through design) teachers discovered the value of collaborative work at the computer. Especially in the Primary School, more used to this kind of working and anyway more prepared to experiment, teachers were finding the added value of language development by grouping threes and fours to a keyboard and it meant that the "turn" at the computer could be longer and it came round more frequently. They made up workcards which allowed the computer to become more than a memorable interlude in the "proper" work of the day (but the children still told their parents that they had been "playing with computers to-day"). In the better classrooms the computer was becoming integrated into the curriculum. It was used, as a scarce tool, only where it had something special to contribute.

The curriculum panels of the national progammes wrestled with the role of the computer in their subjects. Each subject wanted this seductive weapon in its armoury. Sometimes it was dragged into use at any price. It was becoming fashionable to talk about "learning with and not learning about the computer". "Computer Studies", examined at 16 years was losing its popularity (not with the parents or with the pupils who had opted for it successfully - an option always oversubscribed) but it was seen to be sapping the school's computer provision; too much demand from too few children. Shortened programmes of "computer literacy" or "awareness" began taking its place. It meant more pupils got their "hands-on experience" (and so fewer parents complained about their children not being allowed to do computer studies, seen by the million as a passport to a job if not to wealth and happiness ever after). It was also partly about the scarcity of trained computer studies teachers.

In April 1986, when MEP had been closed down, my unit, the Microelectronics Education Support Unit (MESU) began to be formed. (We have been more or less fully staffed since January 1987). By this time the local authorities had taken over many of the roles and much of the support provided by MEP. MEP had set up Regional Information Centres, fourteen of them, to service the education authorities of England, Wales and Northern Ireland. Now, with MEP closed, many LEAs had their own support services. Some had formed collectives to maintain with joint finance some or all of the MEP centres services. In all regions the LEA advisers continue to meet across authority boundaries to plot mutual support. MESU was formed to give the authorities of England, Wales and Northern Ireland the sort of support that comes sensibly on a national basis. Our remit tells us to provide support for the LEAs and to the institutions for initial teacher training by

providing them with information and supporting their staff development training. We are to continue the work started by MEP in support of Special Education - through the network of the Special Education Microelectronics Resource Centres (SEMERCs) set up by MEP - until April 1989 (when most of their functions must be taken over by the LEAs) and then to provide from the Unit the support sensibly provided by a national unit. We are required to consolidate the work started by MEP and develop from there. This often means commissioning materials for the classroom around existing computer programs, that help their integration into the learning going on and give guidance to the teacher on the management issues assumed.

We have built our philosophy around a determination to promote and spread good practice, making sure that the work we commission others to do has its origins in the needs defined by our main clients, the LEA advisers and the initial teacher trainers. My staff spends a great deal of time listening - in conferences, with our designated contacts in the LEAs and colleges, with the teacher unions, with the specialist subject and phase associations. Reports are written. Consensus on needs is sought. Typical of the kind of things we are asked for are: video case studies showing good (transferable) classroom practice; materials and ideas which will strengthen (create) primary to secondary continuity of experience in the use of information technology across the curriculum; work to help the portability of software between machines; almost anything that puts the computer into a curriculum context etc.

Having got ideas agreed by our Management Board we go out to tender and by this and other means we place work around the country. We have criteria which have to be satisfied in the placing of this work and we try to achieve a balance, both between the different subjects in the curriculum and the phases of education but also in the geographical spread of our projects.

All this is now going to be helped by a new phase of government intervention. From April, 1988 the Department of Education and Science and the Welsh Office are encouraging LEAs through the "Rate Support Grant" (the mechanism by which central government adds funds to the LEAs) to spend money on new computers and on advisory teachers. In England alone this will account for a spend of £19 million pounds of which some eight and a half million will be spent on creating about six hundred and twenty advisory teachers who will be in post for two years. They are to be recruited from teachers with expertise in an aspect or a phase of the curriculum (rather than in information technology) and the aim is that this will encourage a sensible spread of IT across the curriculum. With the LEAs themselves, we will have the task of training and supporting these advisory teachers. As well as the training, we will give them collections of materials - video case studies, information packs, software and curriculum materials - to use with the teachers and children in the schools they are to support and in their own in-service training. The support they will give directly to teachers will, I feel sure, provide us with the most successful strategy so far. Eventually information technology will be used appropriately across the curriculum and we will be able to ensure every child gets more than just random exposure to the new technologies.

(2)

SECOND PAPER ICCE EDINBURGH, FROM JOHN FOSTER, DIRECTOR, MESU (UK), 29/3/88

When I discovered that my paper for this conference had already been circulated, with despair, I returned to my hotel and wrote another - more or less on the same subject so that those who have burned the midnight oil and read the proceedings get rewarded. Actually it is so that I get better value from this conference. I can only stay for the morning and then I have to rush back to London. I have never before been to a conference where I have had to pay quite so much to hear myself speak. At least now I am getting two papers from me for my money.

Looking through the conference papers I realise what a mix of interest and experience is represented here. Even having computers in common is saying little. As I look through the programme, I hear hobby horses being ridden and well known axes being ground. It is something that worries me about us computer people. There is the danger that at this sort of conference we bring out our favorite cliches and talk contentedly to our fellow cognoscenti and we go away, confirmed in our prejudices, refreshed but no more wise. We too easily ignore generations of hard argued learning theory just because we are clever and skilled enough to understand computer manuals. We know, and Piagetians remind us, that children usually develop concepts through a process that moves from concrete operational experience through to abstraction. And yet we make children wrestle with programs far beyond their powers of abstraction. We give them simulated experiences when the real thing is sensible, easy, desirable. I was in a class a few months back (not in England - or even in Scotland) where there were forty-three computers for a class of forty-three - excellent provision you may say. But the class was working on pictorial representations of batteries and bulbs and pieces of wire, being told and being asked what happened when they were connected up in different ways, parallel and in series. This was a revision program I was told, but the teacher could not tell me when or even IF the children had ever connected up bulbs and batteries. What is more, he kept the class in strict lock step, and a child who pressed the "right" button before he was told he could was made to re-boot the whole system while his colleagues waited in scorn. The bright, hard working teacher had spent many hours working in an authoring language to write the program - almost the only program in the school. What is the cost of 43 sets of bulbs and batteries? Can this simulated experience be as effective? Alright, this is an extreme example but I am sure you will find similar things, even perhaps in the exhibition of this conference. Programs where infants are tortuously encouraged by multiple keystrokes and complex use of joysticks to pour screen images of water, flat and dry, between two dimensional screen images of jugs - the complexity of the mechanics, obfuscating the mathematical problem posed; modern language drills of a kind that modern linguists had abandoned before the computer resurrected them. Should we really be using this seductive, powerful tool as a purveyor of educational archeology - inappropriate learning - the products perhaps of the ego trips of the few, peddling their belief to other teachers, parents and publishers alike that computer use = good practice and that proximity to this panacea will somehow give us better equipped generations of children, ready to face the challenges of the information society.

These sorts of practice give the computer a bad name and we really cannot afford to let this happen. It is far too useful in its power to seduce children into learning. Appropriately used it can make children perform far above our expectations of their abilities, showing us how much in the past we have allowed children to under achieve. They can allow a profound change to way classrooms are managed. Interaction rather than didacticism. Collaborative, motivating, free from the unchequered, relentless teacher monologue that you can hear permeating the walls of school corridors in every

country in the world - without talk teachers feel they are not doing what they are paid for. And we get annoyed that our colleagues and the politicians who make our budgets cannot see this. But what do they see? Too often they see the teacher species I call the microids; busy in their enthusiasm and full of buzz words and jargon; (they wake up in the morning and consider what they will do with their computers before they consider what they must teach). They see that part of the artificial intelligence community, the artificial intelligentsia, too often more artificial than intelligent, who promise everything tomorrow - always tomorrow - always. They hear us making unsubstantiated claims for the success of our ways, based on gut reactions and intuition, often not even recorded. We always seem to be wanting new toys. I remember the heady days when the Commodore PET went up from an 8k machine to a 16k machine and many of us couldn't think that we would need all that extra memory - but still we wanted it, ahead of our seeing the problems this extra capacity could help us with. We make things difficult - exclusive. Programs are run in different ways and teachers have to spend too long in learning how to operate all the different systems. It is no small wonder that our colleagues are prepared to sacrifice their turn with this infernal system to the first microid that offers to take it from them and, having got out trying things out once, it is easier to make a habit of not opening their minds to these unproved possibilities. And our politicians, our pay masters, at one time keen to be seen supporting the new, proving themselves to be in the van, achieving reputations for forward thinking by supporting us; are increasingly paling at the costs we bring; are becoming increasingly convinced that children + computers = play: that the profession, as ever, is following new gimmicks, unthought out and needs to be called to order. The cry to return to basics, to Victorian values in education is not a call for more computers in our schools.

So what is to be done? Everywhere it seems, education is getting a bad press - and often simply because we do not remember to tell people about the good things that are happening. Knocking copy is fashionable but if schools and educational institutions took seriously the problems of public relations and made sure that success is recorded and broadcast around, we might surely change the political climate. What does it do to our image to continue to be seen as the pauper profession with our begging bowl to industry. Why are we not going out and selling our spare capacity like some French schools do (or at least did in Bordeaux when I was there looking at the exciting if short lived "Informatiques pour Tous" scheme and saw schools profiting from the payroll tax for industrial re-training, selling their training expertise on the open market).

We need to show success. This may produce difficult decisions short term. Should we at least consider putting scarce resources where they will have most effect. Can we afford to spread the jam so thin, in the name of democracy that it makes no difference anywhere? Should we not be showing what can be done and then challenging society to make this available to all children. We talk a lot in my Unit about the entitlement of ALL children to use the tool of the new technologies in their learning - but we need to prove it now and society is not in the mood to give us too many second chances to do so.

In England and Wales we are going through the trauma of being given a National Curriculum, a thing that, in theory at least, our profession has resisted (although in practice it has been more or less there for the last hundred years). It is significant that computer studies does not appear in the core and yet is perceived as being essential to the delivery of the new curriculum wherever it is appropriate. This gives us a marvellous opportunity. But there are dangers Computer studies as an examined subject had started to go into a decline. Not because it has lost popularity with the clients (and certainly not with their parents). It soaks too much of the computer resource

and too many teachers of computing are being seduced into industry. Schools compromised by putting on watered down computer studies courses on "computer literacy", taking fewer periods in the week and therefore being available to more pupils. But at least SOME children were getting taught SOMETHING about, (and often with computers). The content of these computer literacy and computer studies courses COULD be split up and used appropriately across the rest of the curriculum but there is a danger that we will abandon the one before we have installed the other - and that installation is going to take a lot of in-service training and curriculum development. Ideally the examined subject should not be discarded until children can be shown to have acquired the necessary knowledge to pass the examination simply from their other studies. There is also the danger that we concentrate so much on the role of the new technologies serving the old curriculum that we neglect to sell the idea that the new technologies enable a new curriculum, more relevant to children going into the 21st century.

In addition our Department of Education and Science has announced a five year programme highlighting the appropriate uses of information technology in the curriculum. For the year from the 1st April 1988, 19 million pounds is being spent in England alone by central government, to supplement the spend of local education authorities, schools and PTAs. We will need to prove that this is worthwhile. 8 and a half million is being spent on more hardware but, significantly, the greater amount, 10.5 million is being spent on advisory teachers who will work alongside the teachers in a handful of schools, and, we hope in a very unmicroid manner, will support and change them. These advisory teachers are to be recruited from good practitioners, good curriculum developers, good phase experts - and not particularly from people with remarkable IT skills (though they shouldn't perhaps be allergic to IT). My Unit has the task of training and supporting them - probably some 700 of them, in their IT and in their role as change agents. We have thought a lot about this and talked to a lot of people about what they will need - and what is appropriate for them on a series of regional courses. We have looked at some of the reasons that teachers do not adopt the new technologies - some of which I have already mentioned. We have to address the problems of classroom management. Many teachers find it difficult to visualise their role in the classroom with a computer (especially if there is only one computer and an awful lot of children) - that is, unless they use it as an electronic blackboard - teacher centred and not exactly the most interactive - especially if the screen is too small to be seen by most of the class. We are therefore making a series of video case studies of child-child, child-teacher and teacher-child interactions - indexed - and without voice over, simply notes on paper. We are commissioning curriculum materials around existing software as a prop that can be followed first time through like holy writ. We are addressing the benefits of IT for children with special educational needs, more and more often being integrated into the mainstream classroom these days and in danger of being handicapped by their disabilities if we do not use the techniques that can help to support them through the use of new technologies. (These children, and the severely and multiply handicapped provide excellent examples of successful uses of IT - they can sometimes only access the outside world and communicate with it with the the help of IT and examples of this can be dramatic). We are building in evaluation wherever possible and trying to ensure that success is not only recorded but that the knowledge of good practice is spread.

We aim also to work with SCET on the problem of many and diverse user interfaces and machines and on software portability standards, to be discussed at several sessions of this conference. Wherever we get proof of anything we aim to document and to publish. We hope our experiences will cross frontiers and that you will be happy to send us your ideas back. If we don't get it right this time, there may not be a second chance.

Provoking, Supporting and Sustaining Classroom Change

J.F. Foster*

ABSTRACT

Children being brought up in the IT age need to be exposed to the new technologies. In spite of our best endeavours only a small proportion of teachers in England are as yet using the computer as a tool with their classes on a regular basis. They need to see a positive advantage in taking up new methods which may appear to make their work more difficult.

Combinations of in-service training, peer group pressure, pressure from society and the requirements of examination syllabi may cause teachers to change their practice. This has to be supported by suitable training, sufficient appropriate equipment, appropriate curriculum materials and technical and professional assistance if the changes are to be sustained. There must be a national will for these changes reflected, for example, in media cover and in the provision of adequate financial resources. Various strategies and case studies are examined.

INTRODUCTION

The children in our schools now have got to be sufficiently successful to earn enough, to pay enough tax, to enable government to pay me large welfare cheques, to keep me in my old age (which I intend should be long and comfortable). If they are to be this successful they will need every bit of help that their schools can give them. And one of the tools that will help this is information technology, put as the servant of the learners, across the curriculum, wherever it is appropriate.

We like to think in England that we are reasonably up with the pack when it comes to provision and implementation of a policy of IT across the curriculum. We had a national Microelectronics Education Programme from 1980 to 1986. This was succeeded by the establishment of the (less well funded) Microelectronics Education Support Unit (which after a year was merged with the Council for Educational Technology). We have had nationally subsidised hardware schemes, software schemes, schemes for promoting the use of peripherals, modems, turtles - you name it, we've done it. And yet the gurus tell us that only some 10% of the teacher population is comfortably using computers with their charges (and presumably within this 10% not all the practice is good?).

This paper is concerned with strategies that seem to be raising this percentage. But first I must consider why teachers are not rushing, lemming like, to embrace the new technologies. Insufficient kit, inadequate training, bad early experiences with trivial or difficult software, fear of exposing ignorance to experienced hobbyist children, misconceptions about the place of IT (the reaction to the panacea pushers) - all play some part in

* Director, Microelectronics Education Support Unit, and Deputy Chief Executive of the National Council for Educational Technology Science Park, University of Warwick, Coventry CV4 7EZ, U.K.

the reluctance of teachers. The resourcing argument is one of the most common and is often a too easy excuse though it has a significant part to play. However, we all know teachers who somehow through their enthusiasm have managed to annex money from all sorts of public and private sources, working the system to the benefit of their classes.

There is a precursor to in-service training in IT which encourages teachers to think about children as burgeoning autonomous learners, taking a greater part in their own learning. Learning needs to become individualised or at least less teacher centred. Children are different and need to be exposed to different ways of learning for them best to be able to attain our goals for them. If teachers think that they can teach a class satisfactorily in lock-step they are unlikely to warm towards teaching methods that support ways that are much more difficult to control, more difficult to prepare for and harder to check up on. They must first be convinced of the increased quality of learning and of motivation that can result from a change in methods. They also have to be satisfied that they will be able to manage them.

There is, as yet, very little objective evidence as to an improvement in the quality of the learning resulting from harnessing the seductive powers of the new technologies - though plenty of anecdotal evidence. And there are few ways to accelerate teacher confidence in their abilities to cope with the new.

SUPPORT

MESU (the Microelectronics Education Support Unit) has the task of trying to support and implement (and influence) government policy and, through the local education authorities and initial teacher training institutions, school and classroom practice. We try to spread and to promote good practice and as good educational technologists we start by looking at the problems we have to solve to do this. We are told:- there are not enough computers; there is not enough software (or anyway not enough of the *right* software); there is not enough training; teachers cannot see their role when children are using computers; programs are too complicated and full of computer jargon; there is no continuity of practice between grades, let alone between junior and secondary schools; there are too many changes going on..... etc., etc.

A school, a local education authority, a nation needs to have a policy and attitude towards the new technologies that can be clearly seen at least by those who are prepared to look. This produces the hidden curriculum for us all. New entrants to the profession must have been exposed to IT at their training college, not just in a couple of modules about computers and how they work, but where their presence is assumed wherever they have something to offer. There should be no "no go" areas. Hardware and human support must be readily available to the best standard that can be afforded and resourcing built firmly into forward budget plans (and this should be known about). In-service, wherever it is sensible, should be delivered by resource based methods including appropriate use of computers. Curriculum materials should reflect the hardware provision (it is a little off putting to have a textbook that presumes you have access to a laboratory full of computers when you actually only get your "turn" to use a single computer with your

class on alternate Thursdays). Different programs should be operated in much the same way so that it is not a question of having to refer constantly to a "driver's handbook" when you take on a new piece of software. Help must be at hand.

We are blessed by a government that is rushing into educational change in every direction and change always gives us opportunities. More power is to be vested in a school's governors and in the headteacher and, at the same time there is being constructed a National Curriculum with attainment targets set and to be tested for. There is a clearly stated wish that information technology should feature wherever it is appropriate across the curriculum and at all ages and stages of development. There are to be five fat financial years for IT (we are just at the end of the first fat year). In this the local authorities have had some £19 million to spend on IT - eight and a half million on computers and ten and a half on "advisory teachers". These "ATs" (there are more than 600 of them) are an extra source of help at hand and a really effective resource in the management of change - and we have been able to engage their help in our Unit's mission.

The ATs have been recruited by the local education authorities (with funding guaranteed initially for two years) for their skills in the curriculum rather than specifically in IT. Their curriculum or phase expertise gives them some initial credibility in the group of schools they are assigned to. They have all had, so far, two weeks of intensive training from MESU. The first week has been concerned with their role as change managers; good practice at different stages of education and the importance of building on previous experiences; and generic IT. For this week they were deliberately mixed together at one of eighteen centres, but in the second week they were grouped with others from their curriculum or phase specialism and we concentrated on good practice in their particular interest in much greater depth. During the lead up period to these courses we had been commissioning special materials to be written for them, both to use for themselves, for the teachers they are having to try to influence and for the children in their classes. In the time available this has often just entailed collecting up existing materials and packaging them up to be more supportive. We got our first six video case studies made of practice - not particularly of *good* practice, but of practice that could start debate and where the best shown was in recognisable contexts, with teachers that they could identify with (not showing ultra small classes of highly self motivated middle class children being taught by exceptionally brilliant teachers with all the latest kit present in abundance).

The software issued was placed in curriculum context, often encrusted in curriculum materials that made no direct call on the computer. There were attempts made to help with the classroom management issues of having perhaps only one computer to 25 or so children, without artificial tasks given to children to keep down the queues at the computer. They shared their ideas with our staff and those who we had employed to help us (we had a 1:7 ratio of helpers to ATs), coping with the technical problems as they presented themselves in the ways that we hope they are now performing in the inservice roles they are now fulfilling.

We used every sort of teaching/learning strategy that seemed appropriate and tried to keep the straight didactic to a minimum.

We tried to promote local mutual support groups who would meet (or at least phone each other) during their employment as ATs (and beyond?) and we introduced them to our own information service which continues to support them with updates and free copies of our publications relevant to their needs. We also tried, but not always very well, to give them leads as to how they could move out from the comparatively secure base of their own curriculum or phase expertise into, for them, the uncharted waters of different curricula, abilities or phases. They will have been remarkably successful if they leave behind them a trail of written and agreed policy statements for their schools on the place of IT across the curriculum. They are all being got together again in the next few months.

While all this has been going on we have been trying to influence other developments: the choice and standardisation of hardware; the development of acceptable protocols for user-interfaces and program specification; moves towards software portability; the curriculum and attainment tests being considered for the National Curriculum; the development of new datalogging practice (and hardware, software and curriculum materials) - which will be fed out to the science AT specialists as part of the evaluation programme; government policies; interactive video etc.

Often our materials are developed with curriculum materials which the bright teacher will discard (and write their own) when they have gained in confidence but our policy is that teachers should NOT be having to write their own software, even with highly sophisticated authoring tools. This, like curriculum development itself, is a highly specialised branch of the profession and needs a team of experts in different aspects of curriculum and software design to be effective. We always try to make sure that the power of the computer is not wasted on trivia or on simulating experiences that should be experienced for real.

SUSTAINING CHANGE

We have real hope that our advisory teachers, sitting alongside classroom teachers will be a real instrument of change. They are after all an additional resource to what the schools and education authorities will be doing anyway in the way of cascade training and distance learning. But we know that the majority of these ATs will then return to their own classrooms, and though they will be brought out from time to time to help in in-service, their direct influence will be limited to their own schools. We must be sure that the changes they help to provoke are not wasted and that the process continues.

The new is especially seductive to some of us but too much of the new all at once palls the appetite. Always looking for new new things to do is also very waring. So we must ensure that teachers get continuing messages that what they are doing is worthwhile so that they continue and refine their practice. This means, amongst other things, that we have to be very much better, than at least we are in Britain, at getting the media to accept that educational success is news. We need to feel that we are part of a movement that is valued outside and inside the profession. We need to be given a say and a part in the development of new ideas and techniques, sharing ownership in what we are asked to do. We need to be praised a little.